

Que 3:

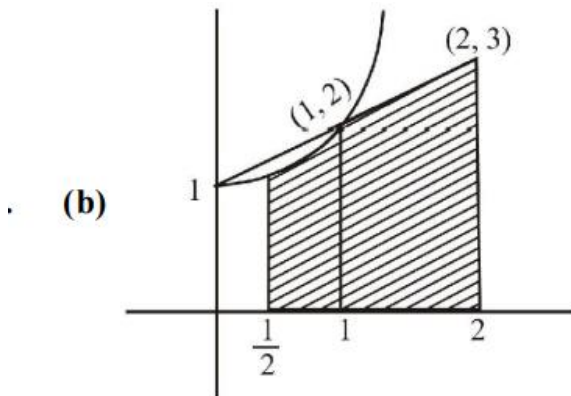
The area (in sq. units) of the region

$\{(x, y) : 0 \leq y \leq x^2 + 1, 0 \leq y \leq x + 1, \frac{1}{2} \leq x \leq 2\}$ is :

[Main Sep. 03, 2020 (I)]

- (a) $\frac{23}{16}$
- (b) $\frac{79}{24}$
- (c) $\frac{79}{16}$
- (d) $\frac{23}{6}$

solution:



$$\text{Required area} = \int_{\frac{1}{2}}^1 (x^2 + 1) dx + \int_1^2 (x + 1) dx$$

$$= \left[\frac{x^3}{3} + x \right]_{\frac{1}{2}}^1 + \left[\frac{x^2}{2} + x \right]_1^2 = \left[\frac{4}{3} - \frac{13}{24} \right] + \frac{5}{2} = \frac{79}{24}.$$